

Management Object Model (MOM) in RTI 1.0

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Review: What is the HLA Concept of MOM?

- Federation Executions are managed by a combination of **Federate-** and **RTI-**supplied information.
- This information can be structured using the same tools used for simulation data.
- The MOM defines object and interaction classes related to federation management just as the FOM defines classes in the simulation domain.
- A manager federate can
 - Monitor and control aspects of the federation through the MOM
 - Subscribe to MOM object and interaction classes exactly as it would to parts of any FOM
- The RTI-supplied aspects of the MOM will be standardized.
- Federate-supplied MOM data depends on the federation needs.

Where Are We in the Process?

- **RTI F.0 provided examples of four MOM action categories**
 - **Generate interactions when interesting things happen**
 - **Register management objects**
 - **Respond to control interactions**
 - **Maintain attributes of management objects**
- **Community feedback**
 - **STOW's RTI-s provides MOM information to DEM**
 - **JTC is replacing AIS with RTI 1.0**
 - **Remove implementation specific features**
- **RTI 1.0 has expanded F.0 capability in scope but not in kind**
 - **New objects and attributes**
 - **Enriched and expanded control capability**

MOM Declarations are Included in the FED (Objects and Attributes)

```
(fed
  (objects
    (class molecule
      (attribute atomic_weight FED_RELIABLE FED_TIMESTAMP)
    )
    (class Manager
      (class Federate
        (attribute FederateTime      FED_RELIABLE FED_RECEIVE)
        (attribute TimeConstrained  FED_RELIABLE FED_RECEIVE)
        (attribute TimeRegulating   FED_RELIABLE FED_RECEIVE)
        (attribute FIFOlength       FED_RELIABLE FED_RECEIVE)
        (attribute TSOLength        FED_RELIABLE FED_RECEIVE)
        (attribute TotalObjectCount FED_RELIABLE FED_RECEIVE)
        ...
      )
      (class Federation
        (attribute FederationName    FED_RELIABLE FED_RECEIVE)
        (attribute FederationState   FED_RELIABLE FED_RECEIVE)
        (attribute FederatesInFederation FED_RELIABLE FED_RECEIVE)
        (attribute SaveIsScheduled   FED_RELIABLE FED_RECEIVE)
        (attribute ScheduledSaveTime FED_RELIABLE FED_RECEIVE)
        (attribute RTIversion        FED_RELIABLE FED_RECEIVE)
      )
    )
  )
  (interactions
    ... )
)
```

An object of this class is created each time a federate joins

An object of this class is created in every federation execution

MOM Declarations are Included in the FED (Interactions and Parameters)

```
(fed
  (objects
    ...
  )
  (interactions
    (class Manager      FED_RELIABLE FED_RECEIVE
      (class Federate   FED_RELIABLE FED_RECEIVE
        ...
        (class Action   FED_RELIABLE FED_RECEIVE
          (parameter ToFederate)
          ...
          (class SetTiming FED_RELIABLE FED_RECEIVE
            (parameter FedReportPeriod)
            (parameter TimeReportPeriod)
            (parameter ObjectReportPeriod)
          )
        )
      )
    )
  )
)
```

By sending interactions with values for these parameters, manager federates can change behavior of another portion of the RTI

Summary of New Objects and Attributes

```
(class Manager
  (class Federate
    (attribute FederateHost          FED_RELIABLE FED_RECEIVE)
    (attribute FederateHandle        FED_RELIABLE FED_RECEIVE)
    (attribute FederateState          FED_RELIABLE FED_RECEIVE)
    (attribute FederateName           FED_RELIABLE FED_RECEIVE)
    (attribute RTIversion             FED_RELIABLE FED_RECEIVE)
    (attribute TimeManagerState       FED_RELIABLE FED_RECEIVE)
    (attribute FederateLookahead      FED_RELIABLE FED_RECEIVE)
    (attribute FederateTime           FED_RELIABLE FED_RECEIVE)
    (attribute TimeConstrained        FED_RELIABLE FED_RECEIVE)
    (attribute TimeRegulating         FED_RELIABLE FED_RECEIVE)
    (attribute FIFOlength             FED_RELIABLE FED_RECEIVE)
    (attribute TSOLength              FED_RELIABLE FED_RECEIVE)
    (attribute DequeueFIFOasync       FED_RELIABLE FED_RECEIVE)
    (attribute TotalObjectCount       FED_RELIABLE FED_RECEIVE)
    (attribute HoldingTokensObjectCount FED_RELIABLE FED_RECEIVE)
    (attribute DeletedObjectCount     FED_RELIABLE FED_RECEIVE)
    (attribute NumAttributes          FED_RELIABLE FED_RECEIVE)
    (attribute NumParameters          FED_RELIABLE FED_RECEIVE)
  )
  (class Federation
    (attribute FederationName         FED_RELIABLE FED_RECEIVE)
    (attribute FederationState        FED_RELIABLE FED_RECEIVE)
    (attribute FederatesInFederation FED_RELIABLE FED_RECEIVE)
    (attribute SaveIsScheduled        FED_RELIABLE FED_RECEIVE)
    (attribute ScheduledSaveTime      FED_RELIABLE FED_RECEIVE)
    (attribute RTIversion              FED_RELIABLE FED_RECEIVE)
```

Summary of New Interaction Classes (Parameters Omitted)

(class Manager	FED_RELIABLE FED_RECEIVE)
(class Federate	FED_RELIABLE FED_RECEIVE)
(parameter FromFederate)	
(class Alert	FED_RELIABLE FED_RECEIVE)
(class ServiceLog	FED_RELIABLE FED_RECEIVE)
(class ServiceLogArguments	FED_RELIABLE FED_RECEIVE)
(class ObjectInformation	FED_RELIABLE FED_RECEIVE)
(class PublishingClass	FED_RELIABLE FED_RECEIVE)
(class SubscribingClass	FED_RELIABLE FED_RECEIVE)
(class Action	FED_RELIABLE FED_RECEIVE)
(parameter ToFederate)	
(class RequestPublicationTree	FED_RELIABLE FED_RECEIVE)
(class RequestSubscriptionTree	FED_RELIABLE FED_RECEIVE)
(class SetTiming	FED_RELIABLE FED_RECEIVE)
(class RequestObjectInformation	FED_RELIABLE FED_RECEIVE)
(class ModifyAttributeState	FED_RELIABLE FED_RECEIVE)
(class RemoteServiceInvocation	FED_RELIABLE FED_RECEIVE)
(class DoResignFederationExecution	FED_RELIABLE FED_RECEIVE)
(class DoDeleteObject	FED_RELIABLE FED_RECEIVE)
(class DoSetLookahead	FED_RELIABLE FED_RECEIVE)
(class DoSetTimeConstrained	FED_RELIABLE FED_RECEIVE)
(class DoTurnRegulationOn	FED_RELIABLE FED_RECEIVE)
(class DoTurnRegulationOff	FED_RELIABLE FED_RECEIVE)
(class Control	FED_RELIABLE FED_RECEIVE)

Example of Parameter Inheritance in MOM

```
(class Manager FED_RELIABLE FED_RECEIVE
  (class Federate FED_RELIABLE FED_RECEIVE
    (parameter FromFederate)
    (class Alert FED_RELIABLE FED_RECEIVE
      (parameter AlertSeverity)
      (parameter AlertText)
      (parameter AlertID))
    (class ServiceLog FED_RELIABLE FED_RECEIVE
      (parameter ServiceName)
      (parameter ServiceInitiator)
      (class ServiceLogArguments FED_RELIABLE FED_RECEIVE
        (parameter Handle1)
        (parameter Handle2)
        (parameter HandleSet)
        (parameter ObjectIDorCount)
        (parameter TagOrLabelOrName)
        (parameter Time)
        (parameter Enumeration)
        (parameter Boolean)))
    (class ObjectInformation FED_RELIABLE FED_RECEIVE
      (parameter ObjectID)
      (parameter LockedAttributes)
      (parameter RegisteredClass)
      (parameter RepresentedClass)
    ...)
```


The Next Steps

- **RTI 1.0 is now in the porting process and will be available soon on all the DMSO supported platforms**
- **The new MOM capabilities and improved capacity make RTI 1.0 a viable choice for an even larger community of users**
- **The Federation Management Tech Exchange is the ongoing vehicle for MOM user participation and feedback**